Wetland Mitigation and Corridor Revegetation Site Monitoring for FAP 658 (IL 29), Sangamon County, Illinois – 2001

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Introduction

Wetland replacement activity has been initiated along the recently constructed section of Illinois Route 29 in Sangamon County, Illinois. The legal location of the site is SE1/4 of NW1/4 of sec. 33, T 17 N, R 5 W (Athens, IL Quad). The wetland replacement site is located in a former agricultural field classified as prior converted wetland by the NRCS. The mitigation site assessment for this area suggested that floodplain forest would be the most likely development for this site (Plocher and Tessene 1995).

Field monitoring of this area began in 2000 and will continue for five years, as requested by the Illinois Department of Transportation. In 2000, field monitoring was conducted on 29 August. As of the 2000 field season, only Area B had been planted and therefore was the only area included in the first years report. This area was planted with a wetland grass seeding (*Elymus canadensis*, *Elymus virginicus*, *Spartina pectinata* and *Calamagrostis canadensis*) and with woody hydrophytic vegetation (*Quercus palustris*, *Quercus bicolor*, *Betula nigra*, *Fraxinus pennsylvanica* and *Carya illinoiensis*). Monitoring of Area A was initiated in 2001 after planting was completed. The wetland compensation plan was modified for this area. Area A will be monitored as an emergent community (Brooks 2001). Only herbaceous vegetation was planted in this area. Emergent herbs planted in Area A were *Asclepias incarnata*, *Leersia oryzoides*, *Eupatorium maculatum*, *Spartina pectinata*, and *Calamagrostis canadensis*. Project goals, objectives, and performance criteria are included in this report, as are monitoring methods, monitoring results, summary information and recommendations.

Project Goals, Objectives and Performance Criteria

Proposed goals and objectives for the wetland mitigation project are based on information contained in the original IDOT project request (Brooks 2000) and in the modified project request (Brooks 2001). Performance criteria are based on those specified in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and *Guidelines for Developing Mitigation Proposals* (USACOE 1993). Each goal should be attained by the end of the five year monitoring period. Project goals, objectives and performance criteria are listed below.

Constructed Wetland Site

Project Goal #1: At the end of the five year monitoring period both created wetland communities should be jurisdictional wetlands as defined by current federal standards.

Objective: The created wetland should comprise 2.43 hectares (6.0 acres) of jurisdictional wetland.

Performance Criteria: The entire created wetland should satisfy the three criteria of the federal wetland definition: dominant hydrophytic vegetation, hydric soils and wetland hydrology.

A. Predominance of Hydrophytic Vegetation – More than 50% of the dominant plant species must be hydrophytic.

B. Presence of Hydric Soils – Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at this site.

C. Presence of Wetland Hydrology – The compensation area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.

Project Goal #2: In Area B, a floodplain forest wetland community will be created.

Objective: Planting the area with hydrophytic tree species should compensate for the loss of previously altered wetlands.

Performance Criteria: Seventy-five percent of the planted trees should be in a live and healthy condition each year for five years.

Project Goal #3: In Area A, a native, non-weedy, emergent wetland community will be created.

Objective: Planting the area with high quality native emergent vegetation should reduce the pressures from successional, non-native, weedy species.

Performance Criteria: In Area A, at least 90% of the plant species present should be non-weedy, native, perennial and annual species, and none of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow or reed canary grass.

Methods

Monitoring is performed on two areas of the constructed wetland site. The monitoring for Area B, consisting of wetland determinations and tree survivability surveys, began in 2000 and will continue for five years. Herbaceous vegetation in Area A was monitored for the first time in 2001, after the area had been fully planted. Illinois Natural History Survey (INHS) personnel will monitor the biological parameters and Illinois State Geological Survey (ISGS) personnel will monitor hydrology. Yearly tree surveys in Area B and herbaceous sampling in Area A will

be submitted in yearly monitoring reports submitted to the Illinois Department of Transportation on the status of the created wetland site. The likelihood of meeting the proposed goals and performance criteria will also be addressed. If, at any time during the monitoring period, it appears that the goals/performance criteria will not be met at the end of the five-year monitoring period, written management recommendations will be made to IDOT in an effort to correct any problems.

Floristic Quality Index

For both sites to be monitored, a complete list of all spontaneous (not planted) plant species found in the area will be recorded and the Floristic Quality Index will be calculated (Taft *et al.* 1997). The Floristic Quality Index will be calculated both with and without the inclusion of planted species. This index provides a measure of the floristic integrity or level of disturbance of a site. Each plant species is assigned a rating between 0 and 10 (the Coefficient of Conservatism) that is a subjective indicator of how likely a plant may be found on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (C) is common and is likely to tolerate disturbed conditions; a species with a high C is relatively rare and is likely to require specific, undisturbed habitats. Species not identified to species level are not rated and are not included in the calculations.

To calculate the Floristic Quality Index (FQI), first compute the mean C value (also known as mean rated quality), $mCv = \sum C/N$, where $\sum C$ represents the sum of the numerical ratings (C) for all species recorded for a site, and N represents the number of plants on the site. The C value for each species is shown in the species list for the site. Species not native to Illinois (indicated by * in the species list for each site) are not included in calculations. The FQI for each site is determined by multiplying the mean C value times the square root of N [$mCv (\sqrt{N})$]. An Index score below 10 suggests a site of low natural quality; below 5, a highly disturbed site. An FQI value of 20 or more suggests that a site has evidence of native character and may be considered an environmental asset.

Project Goal #1

A wetland delineation will be completed yearly for both wetland community types at this creation site. Since accurate boundaries may not be clear until several years of data have been gathered, wetlands will be marked on an aerial photograph only at the end of the five-year monitoring period. In addition, permanent photo stations have been established in each wetland restoration area and photos will be taken annually in order to help monitor changes in the vegetation. Photo stations will be marked on the aerial photograph.

A. Predominance of Hydrophytic Vegetation – The method for determining dominant hydrophytic vegetation is described in Environmental Laboratory (1987) and Federal Interagency Committee for Wetland Delineation (1989). This method is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned a wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (i.e., FAC, FAC+, FACW-, FACW, FACW+ and OBL) is considered hydrophytic. A predominance of hydrophytic vegetation in the wetland plant community exists if greater than 50% of the dominant species

present are hydrophytic. Planted species were not included in the percentage of dominant hydrophytic vegetation.

In Area A, dominant hydrophytic vegetation was determined based on results of systematic plant sampling. Transects were established perpendicular to the adjacent field beginning at 15 m from the north end of Area A and continuing every 30 m afterwards. Quadrats (0.25 m^2) were placed at 4.5 m intervals along each transect so that each planting zone would have equal opportunity to be sampled. A total of 12 transects and 35 quadrats were sampled in Area A. Cover of all species in each plot was assigned a cover class (Table 1) (Daubenmire 1959). Frequency (proportion of quadrats in which a species occurred) and average cover (calculated using midpoints for each cover class) were used to compute relative frequency (frequency of a species relative to total observations) and relative cover (cover relative to total observed cover), respectively. These two relative values were added to determine the importance value for each species sampled. Importance values were used to determine dominant species. "Dominant species are the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50% of the total dominance measure for the stratum, plus any additional species comprising 20% or more of the total dominance measure for the stratum" (FICWD 1989; Tiner 1999).

Table 1. Cover classes used in vegetation sampling.

Cover Class	Range of Cover (%)	Midpoint of Range (%)
1	0-5	3.0
2	5-25	15.0
3	25-50	37.5
4	50-75	62.5
5	75-95	85.0
6	95-100	97.5

(Daubenmire 1959)

B. Presence of Hydric Soils – Soils will be examined and described annually. A soil core collected from the same general area of the mitigation site will be examined for the presence of redoximorphic features. A detailed profile description of the soil using Munsell color charts to record soil colors will be included. Soil texture and structure will also be recorded. Hydric soils may develop slowly and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at that time, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation are present at the site.

C. Presence of Wetland Hydrology – The ISGS installed a surface-water data logger and shallow monitoring wells within Area B and began water-level monitoring activities in September 2000. Hydrology within Area A was not monitored for the 2001 growing season. Beginning in Fall 2001, the ISGS will monitor Area A with a surface-water data logger and shallow monitoring wells. ISGS personnel will measure water levels monthly. In addition, the site will be surveyed annually for field indicators of wetland hydrology.

Project Goal #2

Tree survivorship will be assessed, in Area B, each year for a five year monitoring period. Every tree will be located, identified and determined to be alive or dead. In Area B, a total of 544 trees were recorded in 2000. These trees included *Quercus palustris* (119), *Quercus bicolor* (106), *Betula nigra* (102), *Fraxinus pennsylvanica* (103) and *Carya illinoensis* (114). Some planting to replace dead trees was done between the 2000 and 2001 with six *Betula nigra*, eight *Fraxinus pennsylvanica*, and four *Quercus bicolor* added to the site. Total number of *Carya illinoensis* and *Quercus palustris* was reduced by five and six, respectively.

Project Goal #3

In Area A, a complete species list was compiled and species were recorded as native or non-native and as weedy or non-weedy. Nativity of plants was determined by consulting Mohlenbrock (1986). Weedy species, for the purposes of this report, are defined as all non-native species and any native species assigned a Coefficient of Conservatism of 0 or 1. Species given a C value of 0-1 correspond to Grime's ruderal species (Grime 1974; Grime *et al.* 1988) which include species adapted to frequent or severe disturbances (Taft *et al.* 1997).

Results

Floristic Quality Index The Floristic Quality Index was calculated in two ways for both areas. First the FQI was calculated using all species at the site, including planted species. The FQI was also calculated without including planted species (spontaneous natives only). Area A had an FQI of 10.5 and a mean C value of 1.8 when planted material was included. These values dropped to 9.0 (FQI) and 1.6 (mean C) when planted species were excluded. Area B had an FQI of 10.4 and a mean C value of 1.6 when planted material was included. These values dropped to 7.3 (FQI) and 1.2 (mean C) when planted species were excluded. These values are indicative of areas with poor natural quality. There were a total of thirty-four native species found in Area A, including the planted species. Area B had a total of 43 native species in 2001, up thirteen from 2000 (Marcum *et al.* 2000). Noteable additions include *Aster simplex*, *Panicum virgatum*, and *Spartina pectinata*. Summary information for Area A and B is given in Tables 2 and 3.

Project Goal #1 At the end of the five year monitoring period the created wetland community should be a jurisdictional wetland as defined by current federal standards.

Area A

Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. Results of vegetation sampling for 2001 indicate that the dominant herbaceous species in Area A are *Echinochloa muricata* (OBL), *Panicum dichotomiflorum* (FACW-), and *Chamaesyce maculata* (FACU-). Table 4 provides frequency, cover, and importance value data for all species sampled at Area A. More than 50% (67%) of the dominant plant species are hydrophytic. This site meets the criterion for predominance of hydrophytic vegetation.

Table 2. Summary table for Area A species list.	
Total Species Richness	41
Native Species Richness	34
% Adventive	17% (7/41)
% Weedy	56% (23/41)
Mean Conservatism (w/ planted material)	1.8
Mean Conservatism (spontaneous natives only)	1.6
Floristic Quality Index (FQI) (w/ planted material)	10.5
Floristic Quality Index (FQI) (spontaneous natives only)	9.0
% Wetland Species (OBL, FACW, FAC) (with planted material)	83% (34/41)
% Wetland Species (OBL, FACW, FAC) (w/o planted material)	82% (31/38)

Table 3. Summary table for Area B species list.	
Total Species Richness	62
Native Species Richness	43
% Adventive	31% (19/62)
Mean Conservatism (with planted material)	1.6
Mean Conservatism (spontaneous natives only)	1.2
Floristic Quality Index (FQI) (with planted material)	10.4
FQI (spontaneous natives only)	7.3
% Wetland Species (OBL, FACW, FAC) (with planted material)	60% (37/62)
% Wetland Species (OBL, FACW, FAC) (w/o planted material)	56% (32/57)

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. This site is an excavated depression, built for the purpose of mitigation. The top layers of soil have been removed leaving a poorly drained substratum with little or no soil development at the surface. Naturally, new soil development has begun and prominent hydric features show up within the stratum. At this time it cannot be determined if the soils are hydric, but hydric soils are likely to develop if current hydrologic conditions continue. Table 5 provides details on features of the soil at Area A. These features are likely relic. There is no basis for comparison in this area because it was not monitored last year. At this time hydric soils cannot be determined but are likely to develop if hydrology continues.

C. Presence of Wetland Hydrology – The performance criterion requires that the compensation area must be either permanently or periodically inundated at average depths less than 2m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season. The ISGS had not initiated water level monitoring at Area A as of the time of the 2001 vegetation and soil monitoring. However, during visits to the site, the following indicators of hydrology were observed: drift lines, algal mats and mud cracks. In addition, there was a small area that was saturated to the surface. This site, at least in part, would appear to have sufficient hydrologic input, but data from ISGS monitoring wells will be needed to make a conclusive determination.

Table 4. Area A vegetation sampling data including frequency, cover, and importance value for all species sampled in 2001.

Species	Indicator	Freq.	Rel Freq.	Cover	Rel Cover	Importance Value
Echinochloa muricata	OBL	0.97	22.72	20.20	32.31	55.03
Panicum dichotomiflorum	FACW-	0.71	16.60	15.07	24.10	40.70
Chamaesyce maculata	FACU-	0.34	7.96	9.07	14.51	22.47
Amaranthus tuberculatus	OBL	0.34	7.96	1.93	3.09	11.05
Ipomoea hederacea	FAC	0.31	7.26	1.50	2.40	9.66
Setaria faberi	FACU+	0.14	3.28	2.71	4.33	7.61
Leersia oryzoides	OBL	0.09	2.11	2.57	4.11	6.22
Sida spinosa	FACU	0.17	3.98	0.43	0.69	4.67
Polygonum lapathifolium	FACW+	0.11	2.58	1.29	2.06	4.64
Iva annua	FAC	0.11	2.58	1.00	1.60	4.18
Polygonum pensylvanicum	FACW+	0.09	2.11	1.21	1.94	4.05
Spartina pectinata	FACW+	0.06	1.41	1.50	2.40	3.81
Chamaesyce humistrata	FACW	0.11	2.58	0.64	1.02	3.60
Cyperus esculentus	FACW	0.06	1.41	0.86	1.38	2.79
Eclipta prostrata	FACW	0.09	2.11	0.21	0.34	2.45
Setaria glauca	FAC	0.09	2.11	0.21	0.34	2.45
Asclepias incarnata	OBL	0.03	0.70	1.07	1.71	2.41
Aster simplex	FACW	0.06	1.41	0.14	0.22	1.63
Polygonum ramosissimum	FAC-	0.06	1.41	0.14	0.22	1.63
Populus deltoides	FAC+	0.06	1.41	0.14	0.22	1.63
Festuca pratensis	FACU-	0.03	0.70	0.07	0.11	0.81
Digitaria ischaemum	FACU	0.03	0.70	0.07	0.11	0.81
Eragrostis cilianensis	FACU	0.03	0.70	0.07	0.11	0.81
Solidago canadensis	FACU	0.03	0.70	0.07	0.11	0.81
Rumex crispus	FAC+	0.03	0.70	0.07	0.11	0.81
Panicum capillare	FAC	0.03	0.70	0.07	0.11	0.81
Poinsettia dentata	UPL	0.03	0.70	0.07	0.11	0.81
Bidens vulgata	FACW	0.03	0.70	0.07	0.11	0.81
unknown seedling		0.03	0.70	0.07	0.11	0.81
		4.27	99.99	62.52	99.98	199.97

Table 5. Description of the soils at the created wetland Area A.

Depth(in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0-4	10YR 2/1	10YR 3/6 ff		Silt Loam	granular
4-13	10YR 3.5/2	10YR 5/6 and 2/2		Clay	massive

Area B

A. Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. Results for 2001 indicate that the dominant herbaceous species in Area B are *Echinochloa muricata* (OBL), *Festuca pratensis* (FACU-), and *Polygonum lapathifolium* (FACW+). The shrub layer dominants are the five

planted tree species: *Betula nigra* (FACW), *Carya illinoensis* (FACW), *Fraxinus pennsylvanica* (FACW), *Quercus bicolor* (FACW+) and *Quercus palustris* (FACW). More than 50% (67%) of the dominant plant species are hydrophytic (planted species were not included in the calculation of percent hydrophytic vegetation). This site meets the criterion for predominance of hydrophytic vegetation.

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. This site is an excavated depression, built for the purpose of mitigation. The top layers of soil had been removed leaving a poorly drained substratum with little or no soil development at the surface. Soil development is underway on this excavated site. There is distinct soil development and weak horizonation noticeable within the stratum. The colors observed, while mostly relic, are forming prominent hydric features. Based on this year's observations, the potential for hydric soil development by the end of five years is very high. At this time it cannot be determined if the soils are hydric; however, hydric soils are likely to develop if current hydrologic conditions continue. Table 6 provides details on features of the soil at Area B.

Table 6. Description of soils at the created wetland Area B.

Depth(in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0-5	10YR 2/1	10YR 4/6 ff	10YR 4/2	Silt Loam	granular
5-13	10YR 2.5/2	10YR 4/6 ff	10YR 4/2	Silty Clay Loam	subangular blocky

C. Presence of Wetland Hydrology – The performance criterion requires that the compensation area must be either permanently or periodically inundated at average depths less than 2m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season. The ISGS initiated water level monitoring at this site in September 2000. Their findings indicate that the total area of created wetland that conclusively satisfied the wetland hydrology criterion in 2001 is 0.17 ha (0.41 ac) (Figure 1). Furthermore, they added that precipitation in the area was below the normal range for the reporting period from September 2000 through August 2001 (Pociask and Watson 2001).

During visits to the site, the following indicators of hydrology were present in Area B: drift lines, algal mats, mud cracks, and some areas of surface or near surface saturation. In addition, there was a small area that was saturated to the surface. Some areas within the site are at a higher landscape position and would appear to not have wetland hydrology. ISGS monitoring well data in the coming years will be needed to make a conclusive determination and to establish extent of the nonwetland area. A drainage feature has begun to form between this site and Area A, allowing water to drain away from Area B toward Area A.

Figure 1. ISGS estimated aerial extent of 2001 wetland hydrology in Area B.

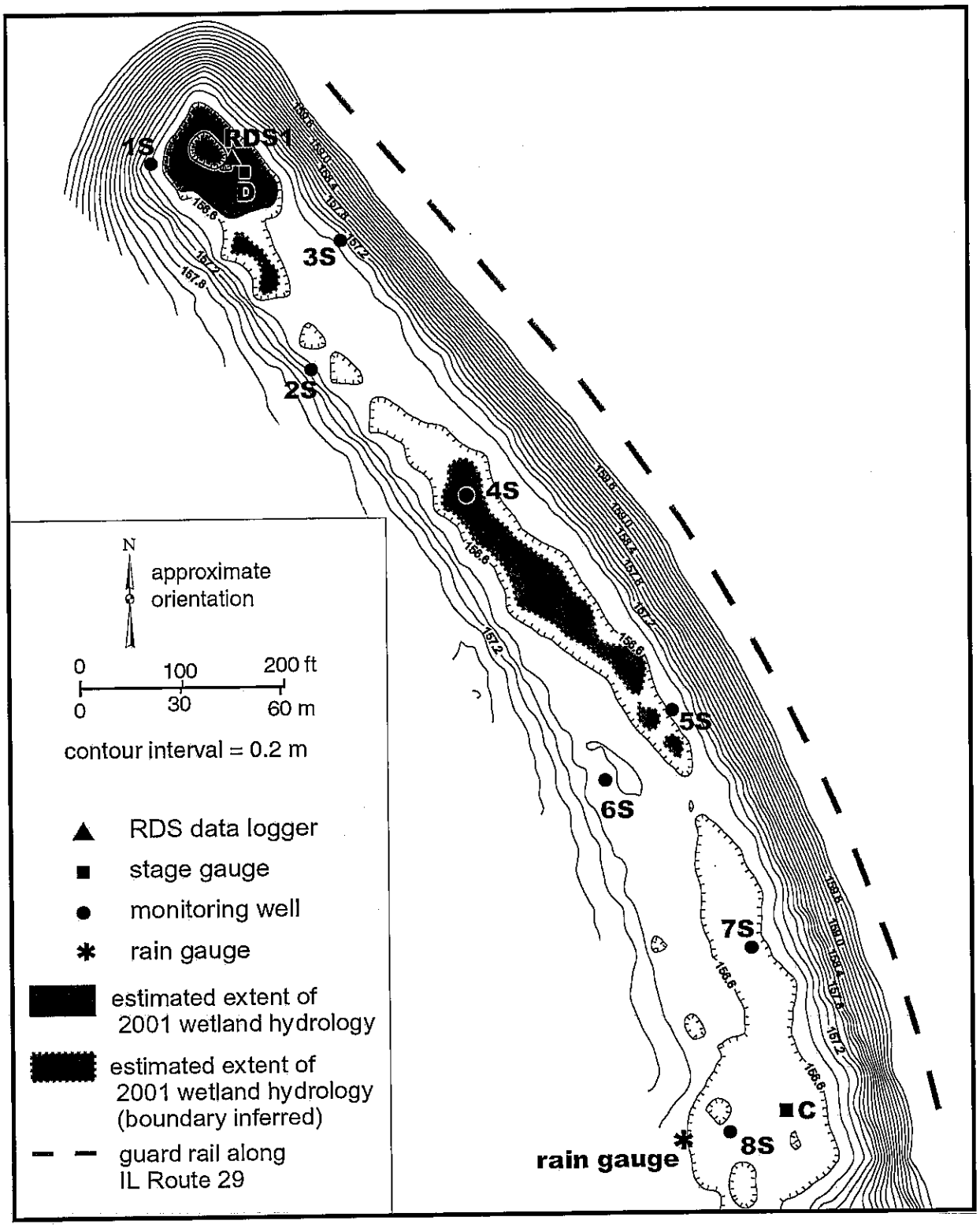

Figure prepared by ISGS

Project Goal #2: In Area B, a floodplain forest wetland community will be created.

All planted trees within Area B were located, identified and their condition was assessed. A total of 551 trees were found alive with no dead trees observed in 2001. Total number of trees for *Betula nigra*, *Fraxinus pennsylvanica*, and *Quercus bicolor* increased from the previous year while total number of *Carya illinoensis* and *Quercus palustris* had decreased since the 2000 monitoring. The number of planted trees was deduced from the 2000 and 2001 tree census data. Apparently, six *Betula nigra*, eight *Fraxinus pennsylvanica*, and four *Quercus bicolor* were planted during the time between the 2000 and 2001 tree monitoring. Once again in 2001, all five tree species easily surpassed the 75% survivorship requirement with the lowest being *Quercus palustris* at 95% survival. Table 7 shows the cumulative survivorship for each tree species planted in Area B.

Table 7. Cumulative tree survival for Area B – 2000 to 2001.

Species	# Alive	# Dead	Total Planted	% Survival
Betula nigra	108	2	110	98.0
Carya illinoensis	109	5	114	95.6
Fraxinus pennsylvanica	111	4	115	96.5
Quercus bicolor	110	3	113	97.3
Quercus palustris	113	6	119	95.0
Totals	551	20	571	96.5

Project Goal #3: In Area A, a native, non-weedy, emergent wetland community will be created.

In Area A, many weedy and non-native species were present during the first year of sampling. Twenty-three of the forty-one species (56%) found at this site were either non-native or weedy species.

Summary and Recommendations

Floristic Quality Index – The Floristic Quality Index was very low for both sites. Area A had an FQI of 10.5 (9.0 without planted material) and Area B had an FQI of 10.4 (7.3 without planted material). However, the vegetation at these sites is just beginning to be established. As is typical for recently disturbed areas, the naturally occurring vegetation at these sites is made up of weedy, early successional native and non-native species. Over time these species will likely be replaced by the more conservative, perennial species that will form a more stable plant community. If that happens, the Floristic Quality Index and the mean C value should rise. *Phalaris arundinacea* continues to be present at Area B and was also found in low numbers in Area A. At this point, *Phalaris* is not a problem at either site. However, the abundance of this aggressive, persistent weed will be monitored.

Project Goal # 1 – Area A was found to have dominant hydrophytic vegetation in the first year of monitoring and hydric soils appear to show signs of forming at least in some areas within the site. Likewise, wetland hydrology appears to be present, at least in part. The key for the future at this site is determining extent of hydric soil formation and extent to which wetland hydrology

exists. Upon first inspection this year, the site appears to be a mosaic of wetland and non-wetland with small high areas and low areas common throughout. Future data, from vegetation sampling, soil formation, and wetland hydrology will determine the extent to which this site is a wetland. Since this site is not yet stable in terms of vegetation, and wetland hydrology is known to fluctuate from year to year, final conclusions on extent of wetland hydrology will be reserved until future data has become available.
Area B did not possess dominant hydrophytic vegetation in its first year of monitoring (2000). However, this site is beginning to show signs of at least an early successional wetland community with *Amaranthus tuberculatus*, *Ammannia coccinea*, and many *Polygonum* spp. becoming present. In 2001, this site did exhibit dominant hydrophytic vegetation and hydric soils appear to show signs of forming at least in some areas within the site. Likewise, wetland hydrology is clearly present, at least in part. Similar to Area A, this site appears to be a mosaic of wetland and non-wetland. In the future, qualitative vegetation and soil formation data along with ISGS wetland hydrology data will determine the extent to which this site is a wetland.logy is not clear for either site.

Project Goal # 2 – The performance criterion for this project goal was easily attained during the first year of monitoring. Tree survival at the site was very encouraging with all five species exhibiting greater than 96% survival for the first year. The large, more mature size of the tree plantings is probably the reason for their great success. After some replanting between the 2000 and 2001 tree monitoring, no dead trees were found within Area B in 2001. The percentage of tree survival remains well above the the required 75% with *Quercus palustris* having the lowest survivability at 95%.

Project Goal #3 – In Area A, native, non-weedy species make up much less than 90% of the species present. However, since there has been only one year of monitoring and the site is newly formed it is not unusual to have such a high percentage of weedy species. As this site progresses, the percentage of weedy species should continue to decrease. Also stated in the performance criterion, none of the dominant species may be non-native or weedy. Currently at Area A, all three dominant species are considered weedy natives. Since this area has only been sampled for one year, to this point, this is not a major concern. Over time, as the higher quality planted species become better established, dominance may shift in their direction.

At this time, the actual area of the wetland cannot be determined. More monitoring of this site and better information about the hydrology will determine the presence and extent of these created wetlands.

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Appendix 1. Wetland Determination Forms

ROUTINE ON-SITE WETLAND DETERMINATION

Area A (page 1 of 5)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River This site continues north for approximately 427 m (1400 ft) where it meets Area B.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: X* No:
** This site is a recently excavated depression, created for mitigation purposes.*

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Chamaesyce maculata*	FACU-	herb
2. *Echinochloa muricata*	OBL	herb
3. *Panicum dichotomiflorum*	FACW-	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Aquic Udorthent.

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 10YR 5/6, and 2/2
Redox Depletions?	Yes:	No: X	

Matrix color: 10YR 2/1 over 10YR 3.5/2
Other indicators: None.
Hydric soils? Yes: No: Undertermined: X
Rationale: This site is an excavated depression, built for the purpose of mitigation. The top layers of soil have been removed leaving a poorly drained substratum with little or no soil development at the surface. New soil development has begun and prominent hydric features show up within the stratum. At this time it cannot be determined if the soils are hydric, but hydric soils are likely to develop if current hydrologic conditions continue.

ROUTINE ON-SITE WETLAND DETERMINATION
Area A (page 2 of 5)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River This site continues north for approximately 427 m (1400 ft) where it meets Area B.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: > 0.3 m (13 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground, and from flood events of the Sangamon River. Water leaves the site via evapotranspiration, groundwater recharge, and through a culvert in the levee at the southern end of the site.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. Algal mats, mud cracks, drift lines, and areas of soil saturation were observed at this site. Some high areas within the site appear to be non-wetland. The ISGS did not monitor hydrology at this site during 2001.
Wetland hydrology: Yes: X (at least in part) No:
Rationale: Field observations suggest that at least part of this site is flooded or saturated long enough to meet the wetland hydrology criterion. Continued yearly data from ISGS monitoring wells will help to make this conclusive (Year to year hydrology data varies depending on precipitation and weather). At the end of the five year monitoring period a conclusive area will be determined that exhibits wetland hydrology. Some high spots within Area A may never exhibit wetland hydrology.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: Undetermined: X
Rationale for decision: This site appears to exhibit wetland hydrology, at least in part. Continued yearly hydrology data from ISGS will be used to conclusively determine extent of wetland hydrology. Hydric soils are developing at the site and dominant hydrophytic vegetation is present. The status of this site is undetermined until more data is collected to substantiate extent of wetland hydrology.

ROUTINE ON-SITE WETLAND DETERMINATION

Area A (page 3 of 5)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River This site continues north for approximately 427 m (1400 ft) where it meets Area B.

Determined by: Paul Marcum, Brian Wilm, Amy Morgan, Jesse Kurylo, Scott Wiesbrook, and Jeff Matthews (vegetation and hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION

Area A (page 4 of 5)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River This site continues north for approximately 427 m (1400 ft) where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Abutilon theophrasti	velvet-leaf	herb	FACU-	*
Acer saccharinum	silver maple	herb	FACW	1
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Apocynum cannabinum	dogbane	herb	FAC	2
♣*Asclepias incarnata*	swamp milkweed	herb	OBL	4
Aster simplex	panicled aster	herb	FACW	3
Bidens frondosa	common beggar's ticks	herb	FACW	1
Campsis radicans	trumpet creeper	herb	FAC	2
Carex vulpinoidea	fox sedge	herb	OBL	3
Chamaesyce humistrata	milk spurge	herb	FACW	1
Chamaesyce maculata	nodding spurge	herb	FACU-	0
Cyperus acuminatus	taperleaf flat sedge	herb	OBL	2
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Echinochloa muricata	barnyard grass	herb	OBL	0
Eleocharis obtusa	blunt spike rush	herb	OBL	2
Eleocharis smallii	marsh spike rush	herb	OBL	5
Eupatorium serotinum	late boneset	herb	FAC+	1
Festuca pratensis	meadow fescue	herb	FACU-	*
Ipomoea hederacea	ivy-leaved morning glory	herb	FAC	*
Ipomoea pandurata	wild sweet potato vine	herb	FACU	2
Iva annua	marsh elder	herb	FAC	0
♣*Leersia oryzoides*	rice cutgrass	herb	OBL	3
Panicum dichotomiflorum	fall panicum	herb	FACW-	0
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Phalaris arundinacea	reed canary grass	herb	FACW+	*
Polygonum lapathifolium	curttop lady's thumb	herb	FACW+	0
Polygonum persicaria	spotted lady's thumb	herb	FACW	*
Polygonum ramosissimum	bushy knotweed	herb	FAC-	3
Populus deltoides	eastern cottonwood	herb	FAC+	2
Rorippa islandica	marsh yellow cress	herb	OBL	4

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area A (page 5 of 5)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
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SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Rumex altissimus	pale dock	herb	FACW-	2
Rumex crispus	curly dock	herb	FAC+	*
Sagittaria latifolia	arrowhead	herb	OBL	4
Salix exigua	sandbar willow	shrub	OBL	1
Salix nigra	black willow	herb	OBL	3
Solanum carolinense	horse nettle	herb	FACU-	0
♣*Spartina pectinata*	freshwater cord grass	herb	FACW+	4
Typha angustifolia	narrow-leaved cattail	herb	OBL	*
Typha latifolia	cattail	herb	OBL	1
Xanthium strumarium	cocklebur	herb	FAC	0

♦Coefficient of Conservatism (Taft *et al.* 1997)
*Non-native species
♣ planted

With planted material
mean C value (mCv) = $\sum C/N = 61/34 = 1.8$
FQI = mCv ($\sqrt{N}$) = 1.8 ($\sqrt{34}$) = 10.5

Without planted material
mean C value (mCv) = $\sum C/N = 50/31 = 1.6$
FQI = mCv ($\sqrt{N}$) = 1.6 ($\sqrt{31}$) = 9.0

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 1 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: X* No:
** This site is a recently excavated depression, created for mitigation purposes.*

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Betula nigra*	planted	shrub
2. *Carya illinoensis*	planted	shrub
3. *Fraxinus pennsylvanica*	planted	shrub
4. *Quercus bicolor*	planted	shrub
5. *Quercus palustris*	planted	shrub
6. *Echinochloa muricata*	OBL	herb
7. *Festuca pratensis*	FACU-	herb
8. *Polygonum lapathifolium*	FACW+	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Aquic Udorthent.

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 10YR 4/6
Redox Depletions?	Yes: X	No:	Color: 10YR 4/2

Matrix color: 10YR 4/1 over 2.5/2
Other indicators: None.
Hydric soils? Yes: No: Undertermined: X
Rationale: This site is an excavated depression, built for the purpose of mitigation. The top layers of soil had been removed leaving a poorly drained substratum with little or no soil development at the surface. Over the past year new soils have begun to develop and hydric features show up within the stratum. At this time it cannot be determined if the soils are hydric, but hydric soils are likely to develop if current hydrologic conditions continue.

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 2 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: >0.66 m (>26 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground and from flood events of the Sangamon River. Water leaves the site via evapotranspiration, groundwater recharge, and through a small channel forming between this site and Area A.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. Algal mats, mud cracks, drift lines, and areas of soil saturation were observed at this site. The ISGS hydrology data for 2001 suggests that only 0.17 ha (0.41 ac) out of 1.20 ha (3.00 ac) satisfy the wetland hydrology criterion; however, precipitation was below the normal range (Pociask and Watson 2001).
Wetland hydrology: Yes: X (at least in part) No:
Rationale: Field observations suggest that at least part of this site is flooded or saturated long enough to meet the wetland hydrology criterion. Continued yearly data from ISGS monitoring wells will help to make this conclusive (Year to year hydrology data varies depending on precipitation and weather). At the end of the five year monitoring period a conclusive area will be determined that exhibits wetland hydrology. Some high spots within Area B may never exhibit wetland hydrology.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: Undetermined: X
Rationale for decision: This site appears to exhibit wetland hydrology, at least in part. Continued yearly hydrology data from ISGS will be used to conclusively determine extent of wetland hydrology. Hydric soils are developing at the site and dominant hydrophytic vegetation is present. The status of this site is undetermined until more data is collected to substantiate extent of wetland hydrology.

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 3 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

Determined by: Paul Marcum, Brian Wilm, Amy Morgan, Jesse Kurylo, Scott Wiesbrook, and Jeff Matthews (vegetation and hydrology)
Jesse Kurylo (soils and hydrology)
Illinois Natural History Survey
Center for Wildlife Ecology
607 East Peabody Drive
Champaign, Illinois 61820
(217) 333-8459 (Marcum)

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 4 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Abutilon theophrasti	velvet-leaf	herb	FACU-	*
Acer negundo	box elder	herb	FACW-	1
Acer saccharinum	silver maple	herb	FACW	1
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Ammannia coccinea	long-leaved ammannia	herb	OBL	5
Apocynum cannabinum	dogbane	herb	FAC	2
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
♣*Betula nigra*	river birch	shrub	FACW	4
Bidens frondosa	common beggar-ticks	herb	FACW	1
Calystegia sepium	American bindweed	herb	FAC	1
Campsis radicans	trumpet creeper	herb	FAC	2
♣*Carya illinoensis*	pecan	shrub	FACW	6
Cassia fasciculata	partridge pea	herb	FACU-	1
Chamaesyce humistrata	milk spurge	herb	FACW	1
Chamaesyce maculata	nodding spurge	herb	FACU-	0
Chenopodium album	lamb's quarters	herb	FAC-	*
Conyza canadensis	horseweed	herb	FAC-	0
Cynanchum laeve	blue vine	herb	FAC	1
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Cyperus strigosus	long scaled nut sedge	herb	FACW	0
Daucus carota	Queen-Anne's-lace	herb	UPL	*
Echinochloa muricata	barnyard grass	herb	OBL	0
Elymus canadensis	Canada wild rye	herb	FAC-	4
Erigeron annuus	annual fleabane	herb	FAC-	1
Eupatorium serotinum	late boneset	herb	FAC+	1
Festuca pratensis	meadow fescue	herb	FACU-	*
♣*Fraxinus pennsylvanica*	green ash	shrub	FACW	2

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 5 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Ipomoea hederacea	ivy-leaved morning glory	herb	FAC	*
Ipomoea pandurata	wild sweet potato vine	herb	FACU	2
Iva annua	marsh elder	herb	FAC	0
Medicago sativa	alfalfa	herb	UPL	*
Melilotus alba	white sweet clover	herb	FACU	*
Oenothera biennis	evening primrose	herb	FACU	1
Panicum dichotomiflorum	fall panicum	herb	FACW-	0
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Phalaris arundinacea	reed canary grass	herb	FACW+	*
Physalis subglabrata	smooth ground cherry	herb	UPL	0
Plantago lanceolata	buckhorn	herb	FAC	*
Poa pratensis	Kentucky bluegrass	herb	FAC-	*
Polygonum hydropiper	common smartweed	herb	OBL	*
Polygonum lapathifolium	pale smartweed	herb	FACW+	0
Polygonum pensylvanicum	giant smartweed	herb	FACW+	1
Polygonum scandens	climbing buckwheat	herb	FAC	2
Populus deltoides	eastern cottonwood	herb	FAC+	2
Portulaca oleracea	purslane	herb	FAC-	*
♣*Quercus bicolor*	swamp white oak	shrub	FACW+	7
♣*Quercus palustris*	pin oak	shrub	FACW	4
Rorippa islandica	marsh yellow cress	herb	OBL	4
Rumex altissimus	pale dock	herb	FACW-	2
Rumex crispus	curly dock	herb	FAC+	*
Rumex obtusifolius	bitter dock	herb	FACW	*
Setaria faberi	giant foxtail	herb	FACU+	*
Sida spinosa	prickly sida	herb	FACU	*
Solanum carolinense	horse nettle	herb	FACU-	0
Solidago canadensis	Canada goldenrod	herb	FACU	1
Sonchus arvensis	field sowthistle	herb	FAC-	*
Trifolium pratense	red clover	herb	FACU+	*

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 6 of 6)

Field Investigators: Marcum, Kurylo, Wilm, Morgan, Wiesbrook, & Matthews
Date: 23 July, 10 September, and 2 October, 2001 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland/Meadow
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Trifolium repens	white clover	herb	FACU+	*
Xanthium strumarium	cockle bur	herb	FAC	0

♦ Coefficient of Conservatism (Taft *et al.* 1997)
*Non-native species
♣ planted

with planted material
mean C value (mCv) = $\sum C/N = 68/43 = 1.6$
FQI = mCv ($\sqrt{N}$) = $1.6(\sqrt{43}) = 10.4$

without planted material
mean C value (mCv) = $\sum C/N = 45/38 = 1.2$
FQI = mCv ($\sqrt{N}$) = $1.2(\sqrt{38}) = 7.3$

Appendix 2. Photos of wetland creation sites

a.

b.

Figure 2. Area A. a. Photostation #1: view from south end of Area A, looking due north. b. Photostation #2: view from north end of Area A, looking due south.

a.

b.

Figure 3. a. Photostation #3: view from northeast corner of Area A, looking south. b. Photostation #4: view from north end of Area B, looking due south.

a.

b.

Figure 4. a. Photostation #5: view from northeast corner of Area B, looking south. b. Photostation #6: view from eastside center of Area B, looking south.